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California Gasoline Prices in Early 2003

I appreciate this opportunity to testify today on the Energy Information Administration's (EIA) preliminary insights into the causes of the surge in California gasoline prices in February and March of 2003. I will summarize our initial findings, which are based on preliminary data and conversations with industry representatives.

The EIA is the statutorily chartered statistical and analytical agency within the Department of Energy. We are charged with providing objective, timely, and relevant data, analysis, and projections for the use of the Department of Energy, other Government agencies, the U.S. Congress, and the public. We produce data and analysis reports that are meant to help policy makers determine energy policy. Because we have an element of statutory independence with respect to the analyses that we publish, our views are strictly those of EIA. We do not speak for the Department or for any particular point of view with respect to energy policy, and our views should not be construed as representing those of the Department or the Administration. EIA's baseline projections on energy trends are widely used by Government agencies, the private sector, and academia for their own energy analyses.

After a period of relative stability for much of 2002, gasoline prices throughout the United States began to rise in December. The national average retail price for regular gasoline rose 36.8 cents per gallon between December 9, 2002, and March 17, 2003, reaching an all-time record (nominal) price of $1.728 per gallon (Figure 1). Over roughly

the same period (though beginning two weeks later), California retail regular gasoline prices rose 62.5 cents to an all-time high of $2.145 per gallon. Since peaking on March 17, 2003, as of the latest data available (June 16, 2003), U.S. and California retail regular gasoline prices have fallen by 21.0 and 35.8 cents per gallon, respectively.

Retail gasoline prices are a function of many influences. Thus, in order to properly assess the causes of a price spike such as seen in early 2003, it is necessary to break down prices into their various components: crude oil prices, refining costs and profits, distribution/marketing costs and profits, and taxes. California spot gasoline prices (approximating the price at the "refinery gate") rose 72.3 cents per gallon between early December 2002 and mid-March 2003, even more than the 62.5-cent increase in retail prices (Figure 2). Thus, taxes and distribution/marketing costs and profits can be largely ignored as factors in the retail price run-up for the purposes of this analysis. Spot prices are influenced by crude oil prices and by local market conditions. Crude oil prices explain 26 cents of the 72 cent-per-gallon increase in spot gasoline prices, but crude oil prices are driven by global market conditions. So to understand California market influences on gasoline prices, the first step is to factor out crude oil prices, by subtracting them from spot gasoline prices.

When the influence of crude oil price is removed from the California price surge, the spike is not larger than price spikes that have occurred historically. Thus, the specific regional factors contributing to this gasoline price run-up, over and above crude oil price increases, caused prices to surge similarly to incidents in the past.

California has historically seen some of the highest, and most volatile, gasoline prices in the United States. The reasons for the striking differences in the behavior of California gasoline prices, as compared to those in other parts of the United States, are numerous, varied, controversial, and not well understood. Several factors contribute to the problem:

- The California refinery system runs near its capacity limits, which means there is little excess capability in the region to respond to unexpected shortfalls;
- California is isolated from and lies a great distance from other supply sources (e.g., 14 days travel by tanker from the Gulf Coast), which prevents a quick resolution to any supply/demand imbalances;
- The region uses a unique gasoline that is difficult and expensive to make, and as a result, the number of other suppliers who can provide product to the State are limited.

Additionally this year, the partial phase-out of methyl tertiary butyl ether (MTBE) from California gasoline, and its replacement with ethanol, contributed to the recent price run-up. Originally, California was scheduled to ban MTBE in January 2003, but a number of factors caused the ban to be delayed for one year. However, many California refiners chose to switch from MTBE to ethanol in January 2003 (Table 1).[1] This resulted in the market being segmented into two non-fungible products, since ethanol-blended gasoline cannot be mixed with other gasolines during the summer, to assure compliance

[1] Refiners still producing gasoline containing MTBE will switch to ethanol-blended gasoline after summer.

with emission requirements. A further complicating factor was that the price increase occurred about the time California refiners were changing from winter-grade gasoline to summer-grade,[2] which is harder to produce and, when using ethanol, requires a change in procedures or timing to assure that uncontaminated summer-grade product is located at terminals on time.

On March 27, 2003, Congressman Doug Ose, Chairman of the House Government Reform Subcommittee on Energy Policy, Natural Resources and Regulatory Affairs, asked that the EIA examine the causes of the increase in the price of California gasoline. His request letter posed several specific questions, and asked for a preliminary response by early May. Our initial findings were provided in a preliminary report that is available on our web site. However, it is important to note that much information is still unknown, and our findings could change when EIA provides its final report in September.

Refinery Supply Impact of Switching to Ethanol

What effect is the shift to ethanol having on refinery capacity in California?

EIA estimates that after switching from MTBE to ethanol, refiners would likely experience somewhere in the vicinity of a 5-percent net loss of gasoline production capability when producing winter-grade gasoline, and a 10-percent net loss when producing summer-grade gasoline. As noted in the next question, MTBE constitutes 11

[2] Federal RFG requires refiners to be producing summer-grade gasoline by May 1, but California requires some southern areas to switch by March 1. This year, the State delayed the start date to April 1 to ease the winter-summer transition when using ethanol. Pipelines, however, require summer-grade product even earlier to assure State compliance. This year, California refiners began producing summer-grade product in February to meet early March pipeline schedules.

percent by volume when used in California reformulated gasoline, and ethanol constitutes close to 6 percent. These volumes meet the Federal requirement that reformulated gasoline contain 2 percent oxygen by weight. This difference in volume creates a net 5 percent volume loss. Additionally, ozone pollution concerns require a more restrictive specification during the summer for volatility (tendency to evaporate), as measured by Reid vapor pressure (RVP). Ethanol increases the RVP of gasoline, so refineries must compensate by removing other gasoline components that have high RVP, such as butanes and pentanes. This additional loss, along with the lower volume of ethanol, creates the net loss of 10 percent for summer-grade California gasoline.

Methyl tertiary butyl ether (MTBE) constitutes 11 percent of California reformulated gasoline by volume. Ethanol only constitutes 5.5 percent. How is California making up for this loss of volume? Based on January and early February data, it seems that the reduction in MTBE was covered by receipts of blending components from other domestic regions and foreign sources.

Data are not yet available to assess the impact on summer gasoline production during the first quarter of 2003. As described above, gasoline production capability is reduced further when producing summer-grade gasoline with ethanol rather than MTBE. To date, we are aware of three areas of change being made to accommodate the losses: 1) investment to convert some conventional gasoline production to production of California Reformulated Gasoline Blendstock for Oxygen Blending (CARBOB); 2) conversion of some MTBE-production facilities to produce additional gasoline

components; 3) acquisition of gasoline components and CARBOB from other States and foreign sources.

General Supply and Logistical Issues

What types of problems (supply, blending, distribution) if any, has EIA witnessed in California due to the shift from MTBE to ethanol? There were two major supply and logistical issues that seemed to contribute to the price increase. Based on initial information, it appears that larger-than-usual planned maintenance outages and the need to segregate two types of gasoline – MTBE-blended and ethanol-blended product – combined to push prices up this past spring.

Normally, planned refinery maintenance outages would have little effect on the market. However, maintenance activities during the first quarter 2003 were larger than usual. Four California refineries underwent major maintenance projects, and a few other refineries had minor maintenance activity. The impact of the maintenance on gasoline production was greatest in February, with gasoline production down over 150 thousand barrels per day from what it would have been had those refineries been operating normally. Typically, a refinery undergoing maintenance would arrange in advance only for its sales under contract (generally branded sales). Any unbranded volumes it might otherwise have sold to independent marketers – who play an important role in balancing final supply and demand and thereby setting prices – would not be served during its turnaround. But such volumes likely would be small, and the unbranded marketers normally would find another supply source. With the sizeable maintenance this year,

more unbranded marketers were likely left without their usual supply. In addition, some of the refiners had to extend maintenance beyond the time planned, which can add further pressure to the market.

The second factor that seemed to affect prices was the split of the California gasoline market into MTBE-blended gasoline and ethanol-blended gasoline. The refiners still producing MTBE-blended gasoline include the largest suppliers to independent marketers. Because ethanol-blended gasoline cannot be commingled with MTBE-blended gasoline, many independent marketers would likely be limited to MTBE-blended gasoline. Refineries that shifted to ethanol-blended gasoline do not normally serve much of the independent market, and likely would plan to produce little more than their branded sales, assuming many independent marketer sales would have to stay with MTBE-blended gasoline. Yet producers of MTBE-blended gasoline would have little idea in advance how much volume such shifts might require. Furthermore, they also cannot know in advance which terminals would see significant increases in demand, if any. And once the picture begins to unfold, it takes time to re-adjust supply patterns. For example, in Northern California, some independent marketers switched terminals to obtain MTBE-blended gasoline, and those new locations could not keep up with the increased demand. Similarly in Southern California, unexpected increased demand for MTBE-blended gasoline created the need to ship extra cargoes of gasoline from Northern California to Southern California, which takes time, keeping the market tight in Southern California.

Explanations for Price Increase

To what extent is the shift from MTBE to ethanol in California reformulated gas causing the price increase? Beyond the influence of crude oil prices, which was significant, the price surge in California seemed to be mainly due to the combination of two factors. The first factor – the segregation of the marketplace into gasolines blended with MTBE and ethanol – set the stage for market tightness, while the second – several refineries undergoing large maintenance outages and some unexpected outage extensions – compounded market tightness. This combination appeared to be the major driver behind the price surge. This finding should not be interpreted to mean that the price surge would have been less severe had all suppliers switched to ethanol-blended gasoline together this year or next year. Different problems would arise under these circumstances. Other factors associated with the MTBE/ethanol changeover, such as ethanol supply and price, and infrastructure to deliver, store and blend ethanol, did not seem to be significant issues.

How much of the increase in California is due to the requirement to change from the winter to summer blend of reformulated gasoline? The change from winter to summer gasoline is more difficult when using ethanol than MTBE due to the need to both produce and keep from contaminating the very-low-RVP blendstock (CARBOB) to which ethanol is added. Also, summer gasoline is more expensive to produce than winter gasoline. However, neither of these issues appeared to play a large role in the price run-up. The mechanics of the shift from the winter to the summer blend went smoothly and did not seem to contribute much to the price spike.

Given the tight refinery capacity margins in California, what are EIA's estimations of price increases assuming California loses 5 percent of its refining capacity for one week? What about a two-week loss of refining capacity? What about a 10-percent loss of refining capacity? Analysis of this problem is complex due to the many factors at play during any one situation. The price impact that a refinery outage alone will have on motor gasoline prices will depend on current conditions in the petroleum markets, such as the availability of other refineries to respond, and the level of gasoline inventories. Furthermore, conditions in California today make total gasoline inventories less relevant than inventories of MTBE-blended and ethanol-blended gasolines, since the two cannot be mixed.

That said, a rough approximation of the impact of refinery capacity losses was developed based on normal market sensitivities and the price spikes in 1999 that occurred as the result of several major refinery outages. Under normal market conditions with an ample gasoline inventory cushion, a 1- or 2-week loss of 5 or 10 percent of the California refining capacity might vary from no impact, if the event occurs during the winter months when demand is low and other refiners can respond, to perhaps as much as a 5-cent-per-gallon increase at other times. In the case where the market is tighter, with less inventory cushion and little extra capacity nearby, a 5-percent loss of capacity could result in an increase of 5 to 10 cents per gallon in the first week, rising to 10 to 20 cents per gallon by the end of the second week. A 10-percent loss of capacity might result in an increase of

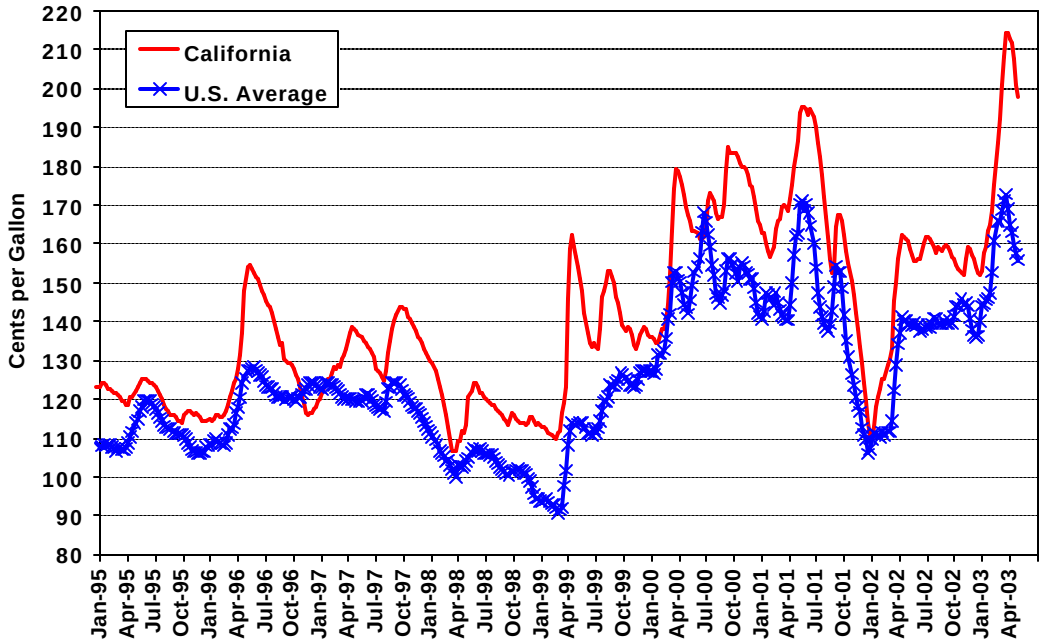
10 to 20 cents per gallon during the first week, rising to 20 to 40 cents per gallon by the end of the second week.

Lessons Learned

Once the phase-out of MTBE is completed after December 31, 2003, what remaining supply and distribution problems will California face? Due to the preliminary nature of EIA's findings, the issues for next summer and lessons learned from California's experiences are not fully developed. However, issues are beginning to surface. While the problem of a market divided between MTBE-blended and ethanol-blended gasolines will be resolved, a variety of issues will still remain that stem from the further loss of productive capacity that will occur when the remaining refiners shift to ethanol. Capacity loss is greatest during the peak demand months of the summer. The result will be a need for more supplies of CARBOB or high-quality components to be brought into the State. The question remains as to whether these materials will be adequately available, and if their transport will further strain harbor facilities.

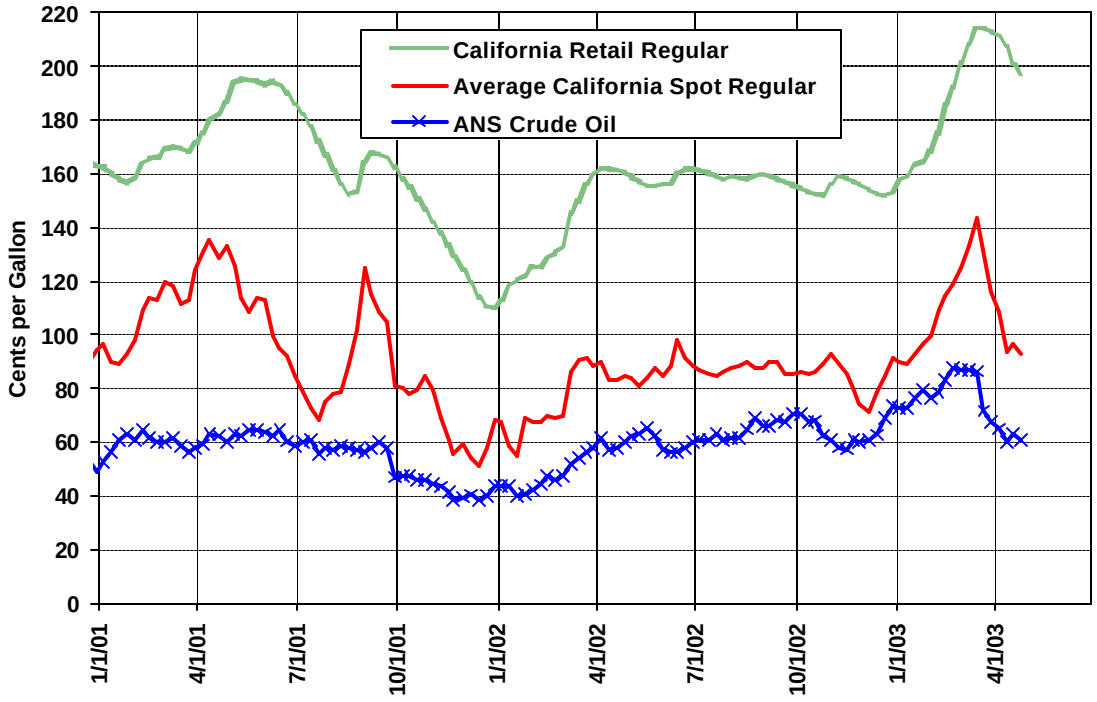
This concludes my testimony. I would be glad to answer any questions at this time.

Figure 1. U.S. and California Retail Gasoline Prices



Source: Energy Information Administration

Figure 2. California Gasoline and ANS Crude Oil Prices



Source: Reuters, Energy Information Administration

Table 1. California Refinery Status for Shifting from MTBE to Ethanol, April 2003

	Location	Notes
Northern California Refiners		
ChevronTexaco	Richmond	Phase-out later this year
Conoco Phillips	Rodeo	Using ethanol for more than one year
Kern Oil	Bakersfield	Blending ethanol
Shell	Bakersfield	Blending ethanol
Shell	Martinez	Blending ethanol
Tesoro	Concord (Avon)	Using limited quantity of ethanol, complete phase-out later this year
Valero	Benicia	Phase-out later this year
Southern California Refiners		
BP	Carson	Blending ethanol
ChevronTexaco	El Segundo	Blending ethanol
ConocoPhillips	Wilmington	Using ethanol for more than one year
ExxonMobil	Torrance	Blending ethanol
Shell	Wilmington	Blending ethanol
Valero	Wilmington	Using limited quantity of ethanol, complete phase-out later this year

Source: California Energy Commission, "California's Phaseout of MTBE – Background and Current Status, Presentation by Gordon Schremp to UC TSR&TP Advisory Committee Spring Meeting, March 17, 2003, p. 13.